PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Yoji OKAZAKI, et al.

Appln. No.: 09/987,049

Confirmation No.: 6352 Group Art Unit: Not Assigned

Filed: November 13, 2001 Examiner: Not Assigned

For: COLOR LASER DISPLAY APPARATUS HAVING FLUORESCENT SCREEN SCANNED WITH MODULATED ULTRAVIOLET LASER LIGHT

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 26, last paragraph bridging page 27, delete and insert the following:

Figure 14 shows an example of a layering structure of a gallium nitride semiconductor laser having a broad area emission range, listed as 1) above. In the gallium nitride semiconductor laser having this layering structure, an n-type $Ga_{1-z1}A1_{z1}N$/GaN super lattice cladding layer 102 ($0.05 < z1 < 1$), an n-type or i-type GaN optical waveguide layer 104, an $In_{1-z2}Ga_{z2}N$ (doped with Si)/$In_{1-z3}Ga_{z3}N$ multiple quantum well active layer 106 ($0.01 < z2 < 0.05$, $0.1 < z3 < 0.3$), a p-type $Ga_{0.8}A1_{0.2}N$ carrier blocking layer 108, an n-type or i-type GaN photoconductive layer 110, a p-type $Ga_{1-z1}A1_{z1}N$/GaN super lattice cladding layer 112, and a p-type GaN contact layer are sequentially layered on an n-type GaN (0001) substrate 100. An insulating film 116 is formed on the p-type GaN contact layer excepting a stripe region with a

width of approximately 50μm. A p-side electrode 118 is formed on said stripe region. An n-side electrode is formed on the reverse surface of the substrate 100. Note that the oscillation wavelength band of this semiconductor laser is 440nm, and the width of its emission range is 50μm. Therefore, the output obtainable therefrom is on the order of 2W, and its light conversion rate is approximately 15%. Laser light emitted from twenty five of these semiconductor lasers is input into a fiber with a core diameter of 500μm to obtain a fiber excitation module 122 having an output of 50W.

Page 30, last paragraph bridging page 31, delete and insert the following:

As shown in Figure 16, at the fiber 140, the laser beam 133 is amplified by receiving energy from fluorescent materials of the same wavelength (1560nm), and is emitted from the emission terminal surface 140b of said fiber 140. The laser beam 133, having a wavelength of 1560nm, is focused by the focusing lens 154 and enters the wavelength conversion portion 156. The laser beam 133 is converted into a fourth harmonic thereof at the wavelength conversion portion, and is emitted therefrom as a laser beam 137 having a wavelength of 390nm. Note that an output of 5W can be obtained by this fiber laser.

REMARKS

The amendments to the specification are typographical in nature and do not add new matter. Accordingly, entry and consideration of this Amendment is respectfully requested.

Respectfully submitted,

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Date: February 8, 2002.

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Page 26, last paragraph bridging page 27, delete and insert the following:

Figure 14 shows an example of a layering structure of a gallium nitride semiconductor laser having a broad area emission range, listed as 1) above. In the gallium nitride semiconductor laser having this layering structure, an n-type $Ga_{1-z1}A1_{z1}N$/GaN super lattice cladding layer 102 ($0.05 < z1 < 1$), an n-type or i-type GaN ~~photoconductive~~ optical waveguide layer 104, an $In_{1-z2}Ga_{z2}N$ (doped with Si)/$In_{1-z3}Ga_{z3}N$ multiple quantum well active layer 106 ($0.01 < z2 < 0.05$, $0.1 < z3 < 0.3$), a p-type $Ga_{0.8}A1_{0.2}N$ carrier blocking layer 108, an n-type or i-type GaN photoconductive layer 110, a p-type $Ga_{1-z1}A1_{z1}N$/GaN super lattice cladding layer 112, and a p-type GaN contact layer are sequentially layered on an n-type GaN (0001) substrate 100. An insulating film 116 is formed on the p-type GaN contact layer excepting a stripe region with a width of approximately 50μm. A p-side electrode 118 is formed on said stripe region. An n-side electrode is formed on the reverse surface of the substrate 100. Note that the oscillation wavelength band of this semiconductor laser is 440nm, and the width of its emission range is 50μm. Therefore, the output obtainable therefrom is on the order of 2W, and its light conversion rate is approximately 15%. Laser light emitted from twenty five of these semiconductor lasers is input into a fiber with a core diameter of 500μm to obtain a fiber excitation module 122 having an output of 50W.

Page 30, last paragraph bridging page 31, delete and insert the following:

As shown in Figure 16, at the fiber 140, the laser beam 133 is amplified by receiving energy from fluorescent materials of the same wavelength (1560nm), and is emitted from the emission terminal surface 140b of said fiber 140. The laser beam 133, having a wavelength of 1560nm, is focused by the focusing lens 154 and enters the wavelength conversion portion 156. The laser beam 133 is converted into a fourth harmonic thereof at the wavelength conversion portion, and is emitted therefrom as a laser beam 137 having a wavelength of 390nm. Note that ~~that~~ an output of 5W can be obtained by this fiber laser.